SHIELDING STUDIES FOR IDS80 (NO IRON PLUG/YOKE), ADDING SHIELDING IN 75 TO 80 cm (WC/H_2O)

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Energy deposition from MARS+MCNP codes (10^{-11} MeV NEUTRON ENERGY CUTOFF).

IDS80 GEOMETRY WITHOUT IRON PLUG AND YOKE MATERIAL (TO ACCOMODATE ACCESS TO DIFFERENT PARTS OF THE TARGET STATION).

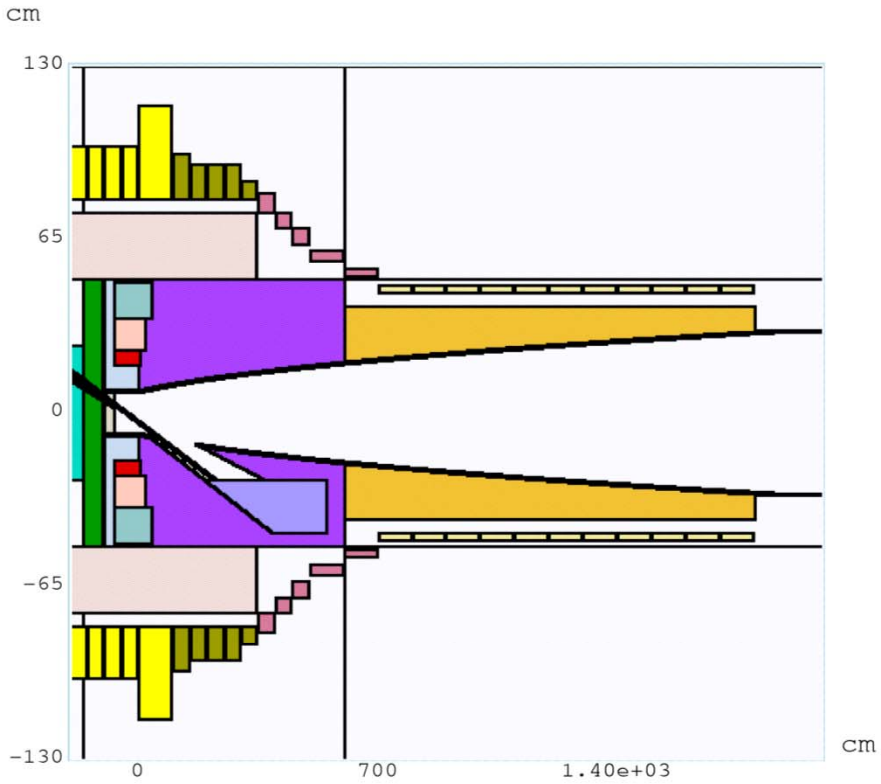
SHIELDING (60%WC+40% H_2O)+ SHIELDING FROM 75 TO 80 cm (60%WC+40% H_2O)

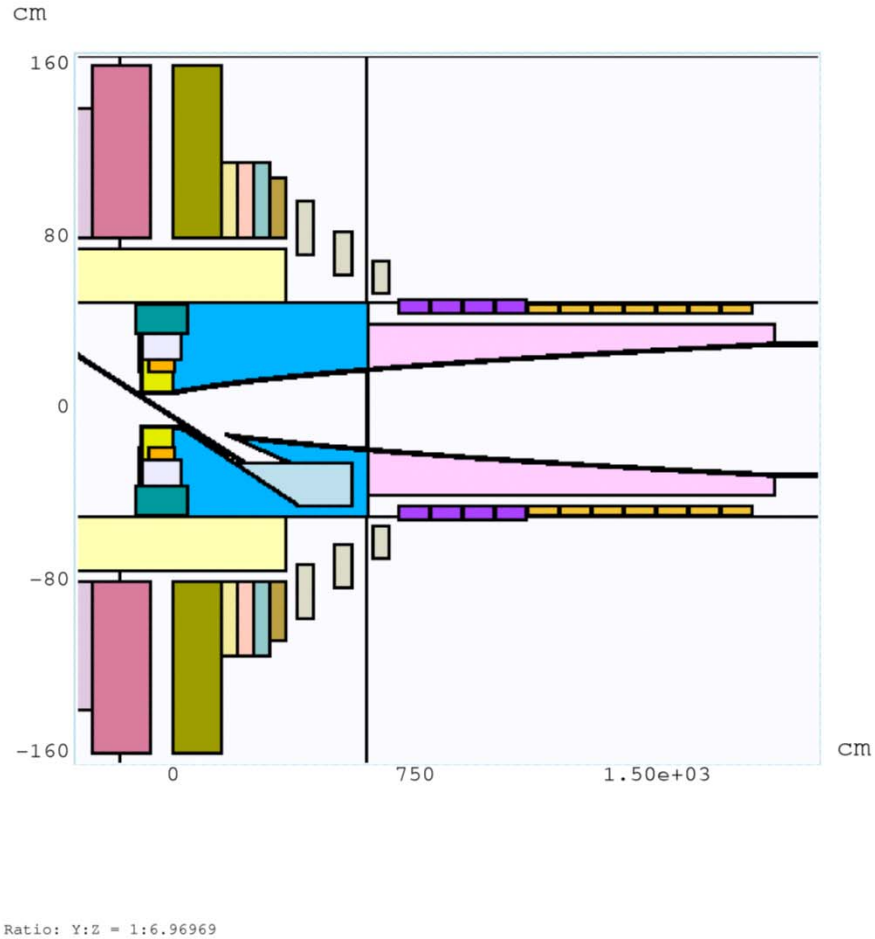
4MW proton beam. Np=400,000

PROTONS ENERGY E=8 GeV.

GAUSSIAN PROFILE: $\sigma_x=\sigma_y=0.12$ cm.

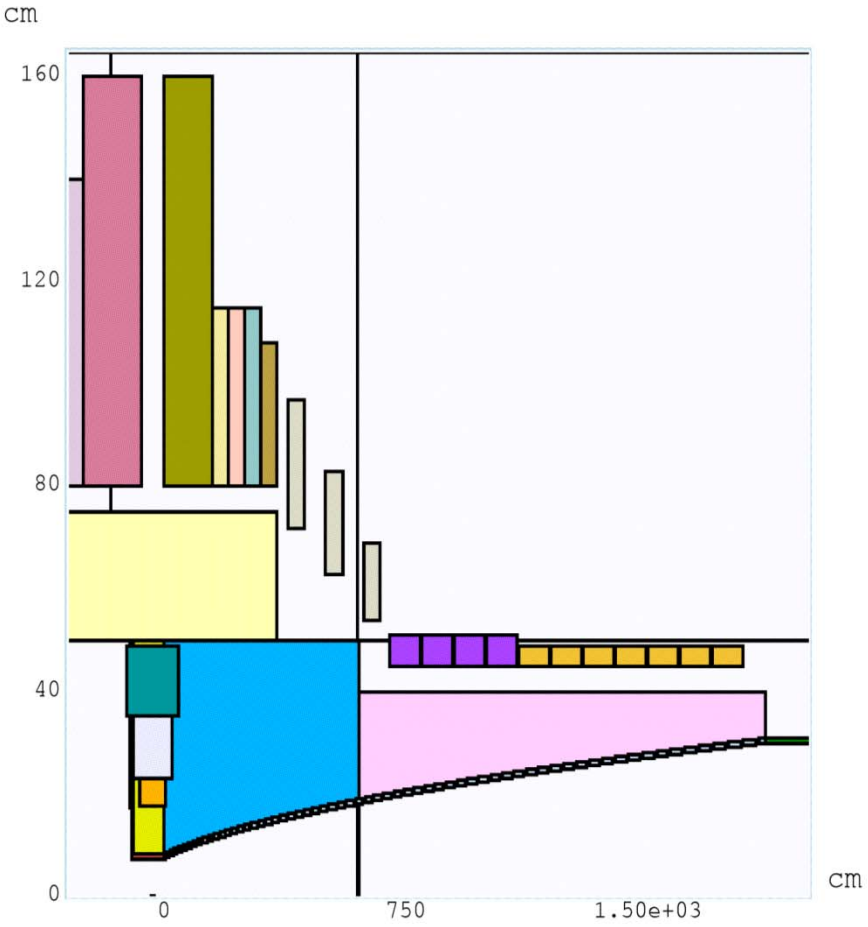
IDS80 GEOMETRY WITH AND WITHOUT IRON PLUG AND YOKE.

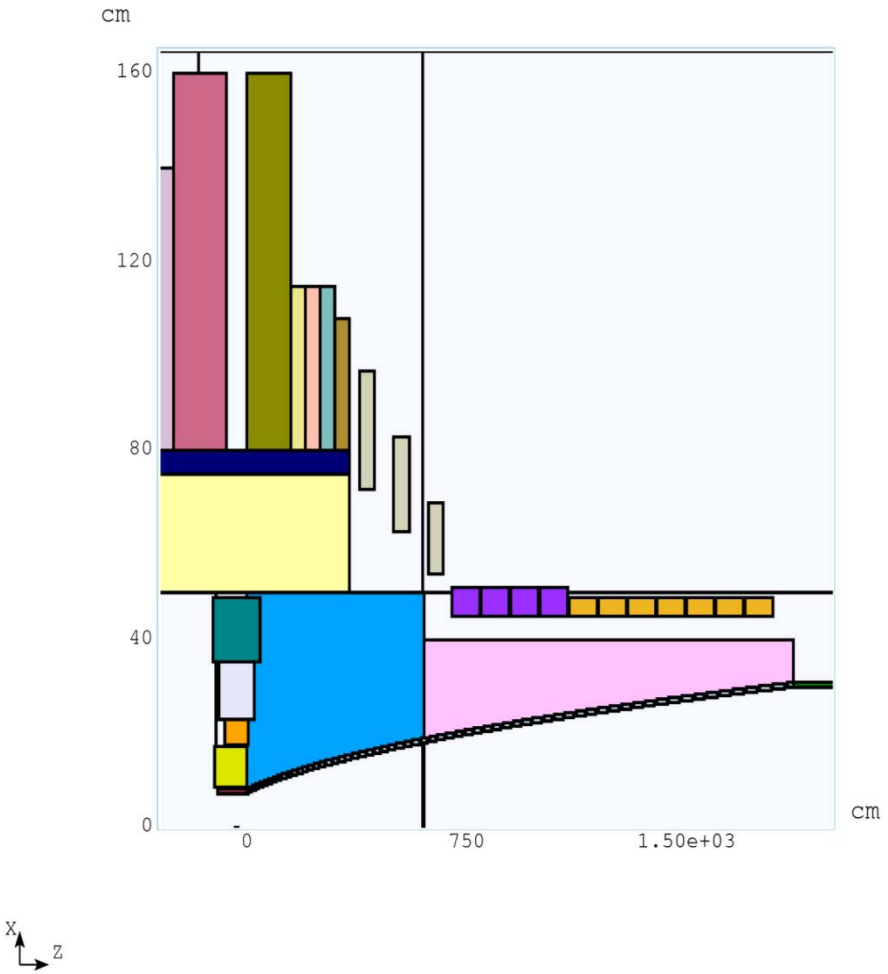




NEW: SC#1-7 -300<z<345 cm R_{in}=80.0 cm R_{out}=140 (1)/160 (2,3)/115 (5-6)/108(7) cm(NbSn)
SC#8-10 383<z<667 cm R_{in}=72/63/54 cm R_{out}=97.0/83/69 cm (NbTi)
SC#11-14 700<z<1090 cm R_{in}=45 cm R_{out}=51 cm (NbTi)
SC#15-21 7190<z<1090 cm R_{in}=45 cm R_{out}=49 cm (NbTi) (TOTAL # SC=21)

INSERT ADDITIONAL SHIELDING (WC/H2O) BETWEEN 75 AND 80 cm RADIUS, AROUND INTERACTION AREA. RESISTIVE COILS --->WC/H2O





ENERGY DEPOSITED IN SC SOLENOIDS (SC#), SHIELDING (SH#).

VAC 75<R<80 cm

NiSn/NiTi	P(kW)
SC#1	$1.18\ 10^{-4}$
SC#2	0.24
SC#3	2.23
SC#4	0.22
SC#5	0.21
SC#6	0.10
SC#7	0.06
SC#1-7	3.06
SC#8-10	0.27
SC#11-14	0.21
SC#15-21	0.19
SC#1-21	3.72

WC/H2O 75<R<80 cm

NiSn/NiTi	P(kW)
SC#1	$8.02\ 10^{-4}$
SC#2	0.18
SC#3	1.62
SC#4	0.17
SC#5	0.12
SC#6	0.07
SC#7	0.05
SC#1-7	2.21
SC#8-10	0.33
SC#11-14	0.22
SC#15-21	0.18
SC#1-21	2.94

NiSn/NiTi	P(kW)	60/40	P(kW)
SC#1-7	3.06	SH#1	944.50
SC#8-10	0.27	SH#2	1141.50
SC#11-14	0.21	SH#3	37.97
SC#15-21	0.19	SH#4	21.74
SC#1-21	3.72	SH#1-4	2145.71

NiSn/NiTi	P(kW)	60/40	P(kW)
SC#1-7	2.21	SH#1	1110.00
SC#8-10	0.33	SH#2	1151.50
SC#11-14	0.22	SH#3	38.42
SC#15-21	0.18	SH#4	23.03
	–	SH#5	1.26
SC#1-21	2.94	SH#1-5	2324.21

ENERGY DEPOSITED IN BEAM PIPE(BP#).

VAC 75<R<80 cm

Cu− >SH	P(kW)	(STST)	P(kW)
RS#1(SH)	78.10	BP#1	207.55
RS#2(SH)	2+3	BP#2	250.00
RS#3(SH)	100.45	BP#3	5.16
RS#1-3(SH)	178.55	BP#1-3	462.71

WC/H2O 75<R<80 cm

(Cu)	P(kW)	(STST)	P(kW)
RS#1	WC/H2O	BP#1	203.50
RS#2	WC/H2O	BP#2	252.85
RS#3	WC/H2O	BP#3	5.16
RS#1-3	WC/H2O	BP#1-3	461.51

ENERGY DEPOSITED IN DIFFERENT PARTS OF TERGET STATION: OTHER PARTS, TOTALS, PEAK VALUES.

VAC 75<R<80 cm

TOTALS	P(kW)
SC#1-21	3.72
SH#1-4	2145.71
RS#1-3	170.77
BP#1-3	462.71
Hg TARG.	376.00
Hg POOL	9.19
Be WIND.	0.50
TOTAL	3176.38

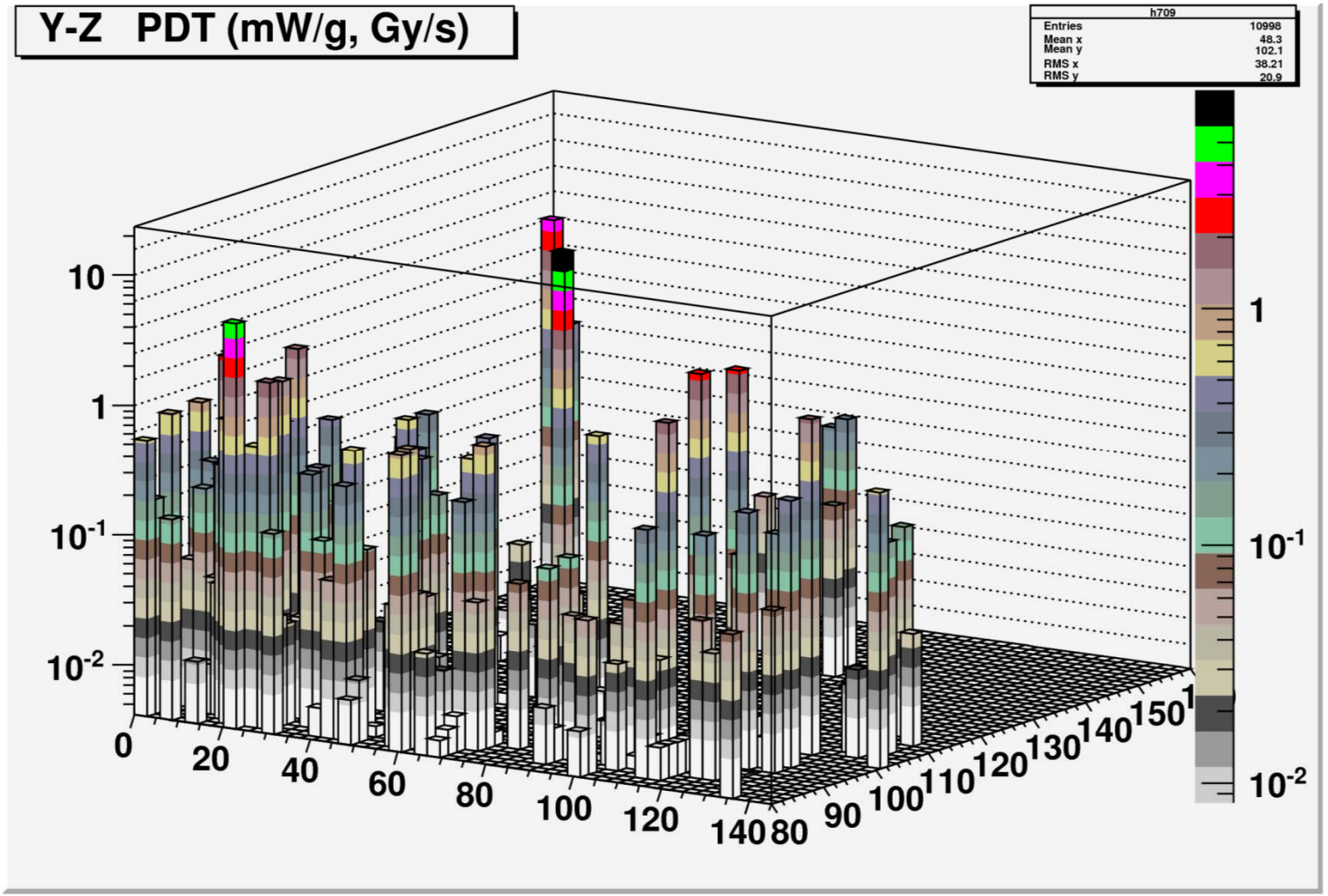
PEAK VALUE SC3: 0.24 mW/gr

WC/H2O 75<R<80 cm

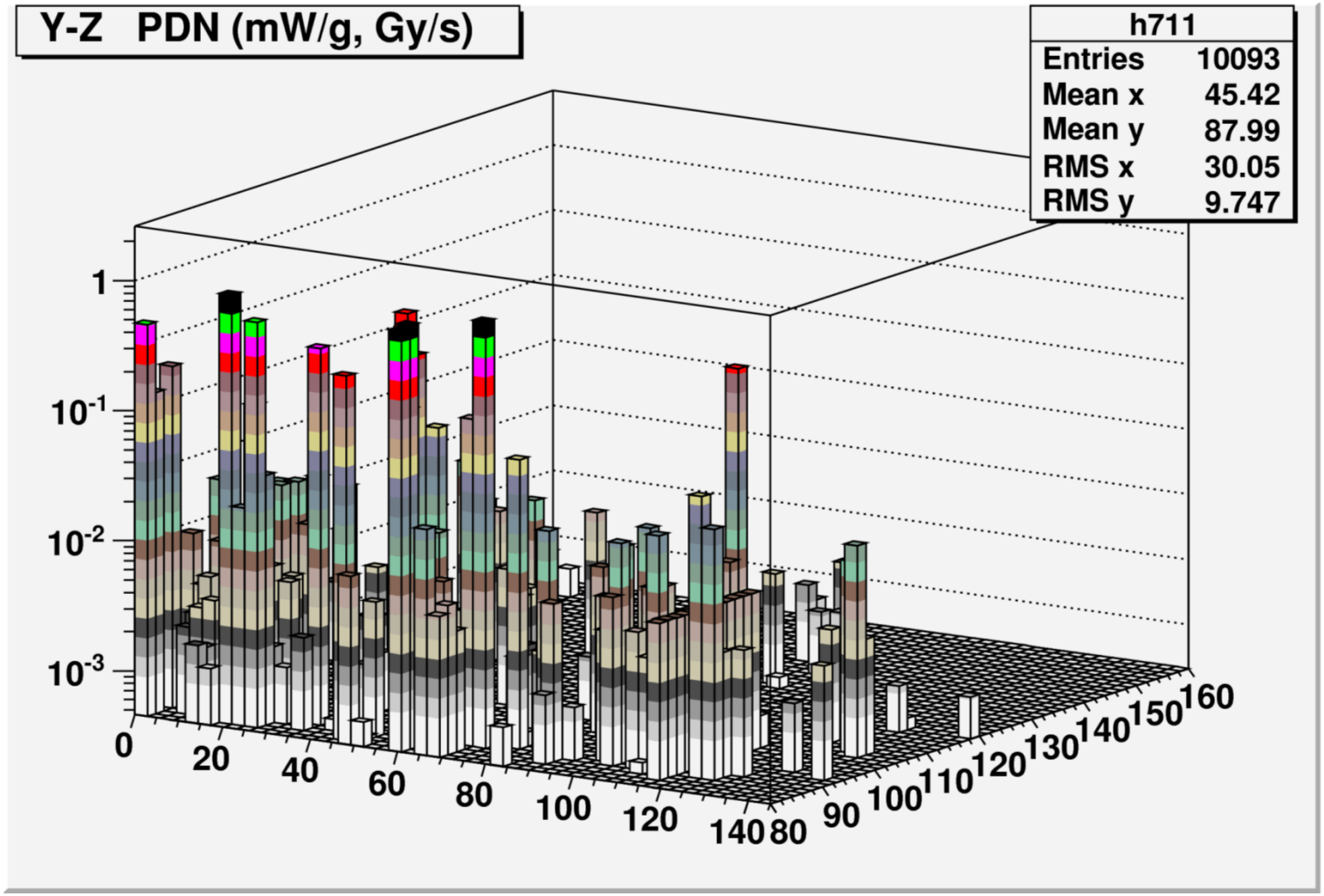
TOTALS	P(kW)
SC#1-21	2.94
SH#1-5	2324.21
RS#1-3	WC/H2O(SH1)
BP#1-3	461.51
Hg TARG.	375.90
Hg POOL	10.20
Be WIND.	0.52
TOTAL	3174.95

PEAK VALUE SC3: 0.23 mW/gr

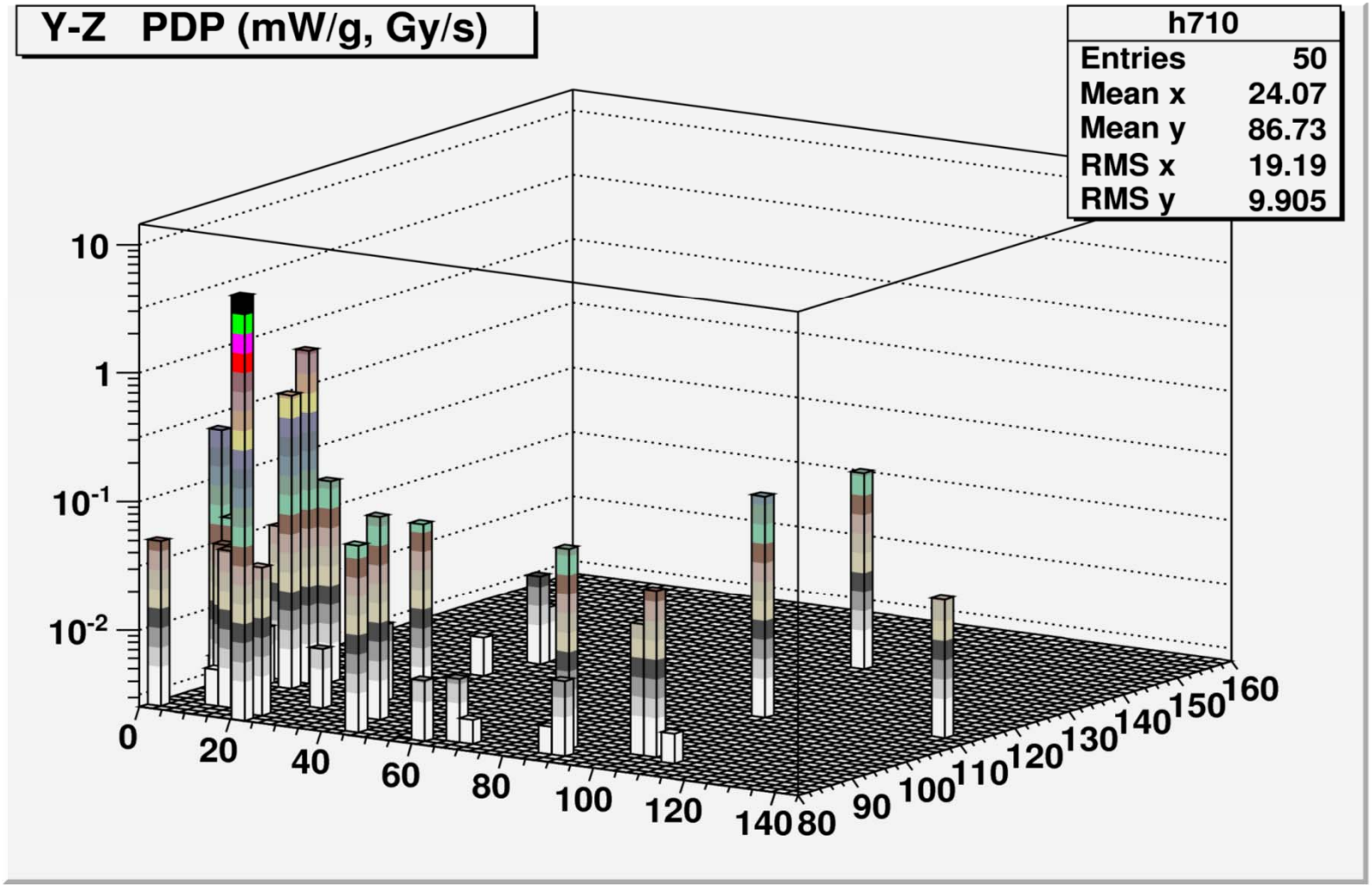
DETAILS OF TOTAL DEPOSITED ENERGY IN SC#3 (+y SLICE: -1.0<x<1.0 80<y<160and 0<z<145 cm) VACUUM FROM 75<r<80cm (10^5 p).



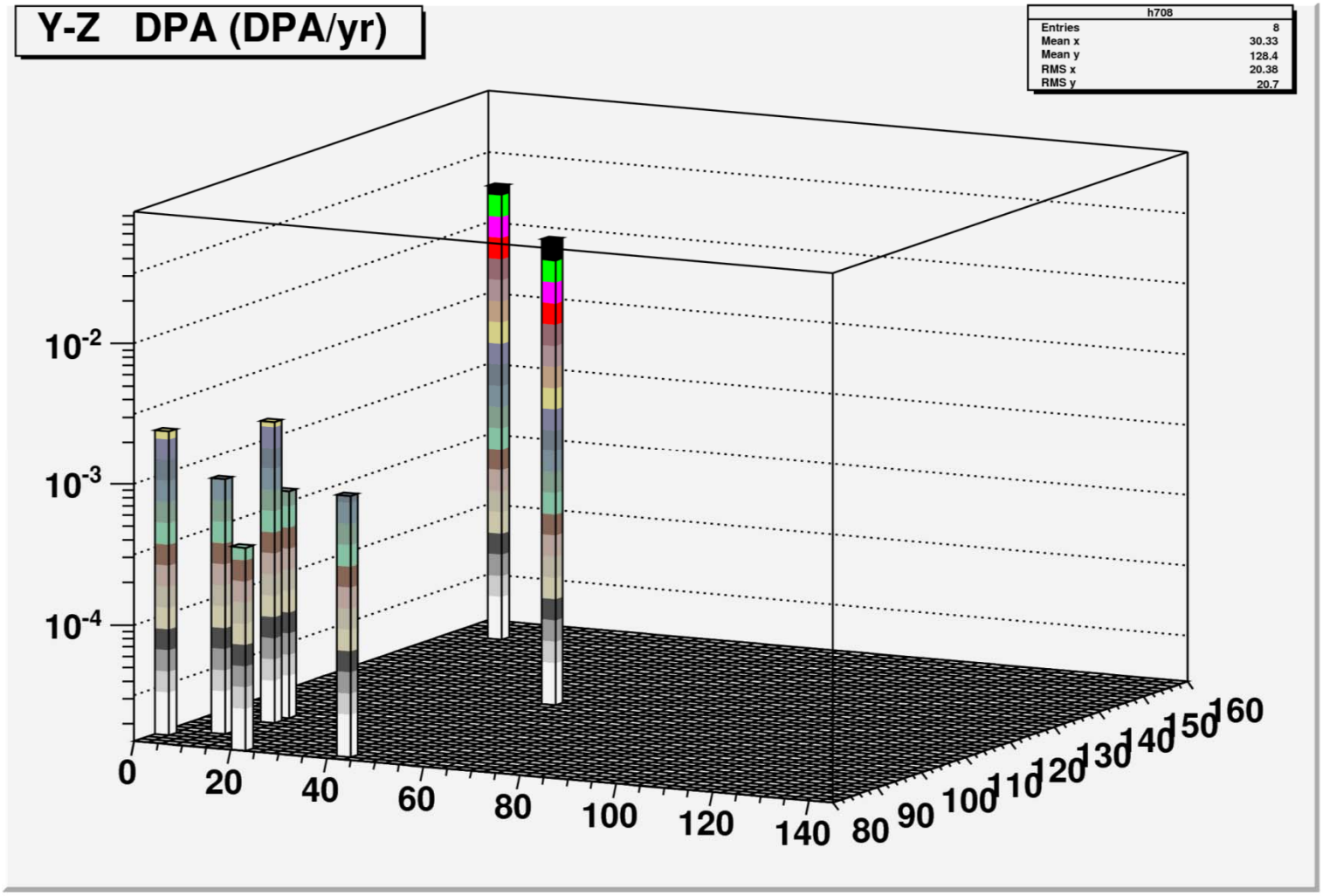
DETAILS OF NEUTRONS DEPOSITED ENERGY IN SC#3 (+y SLICE: -1.0<x<1.0 80<y<160and 0<z<145 cm) VACUUM FROM 75<r<80cm (10^5 p).



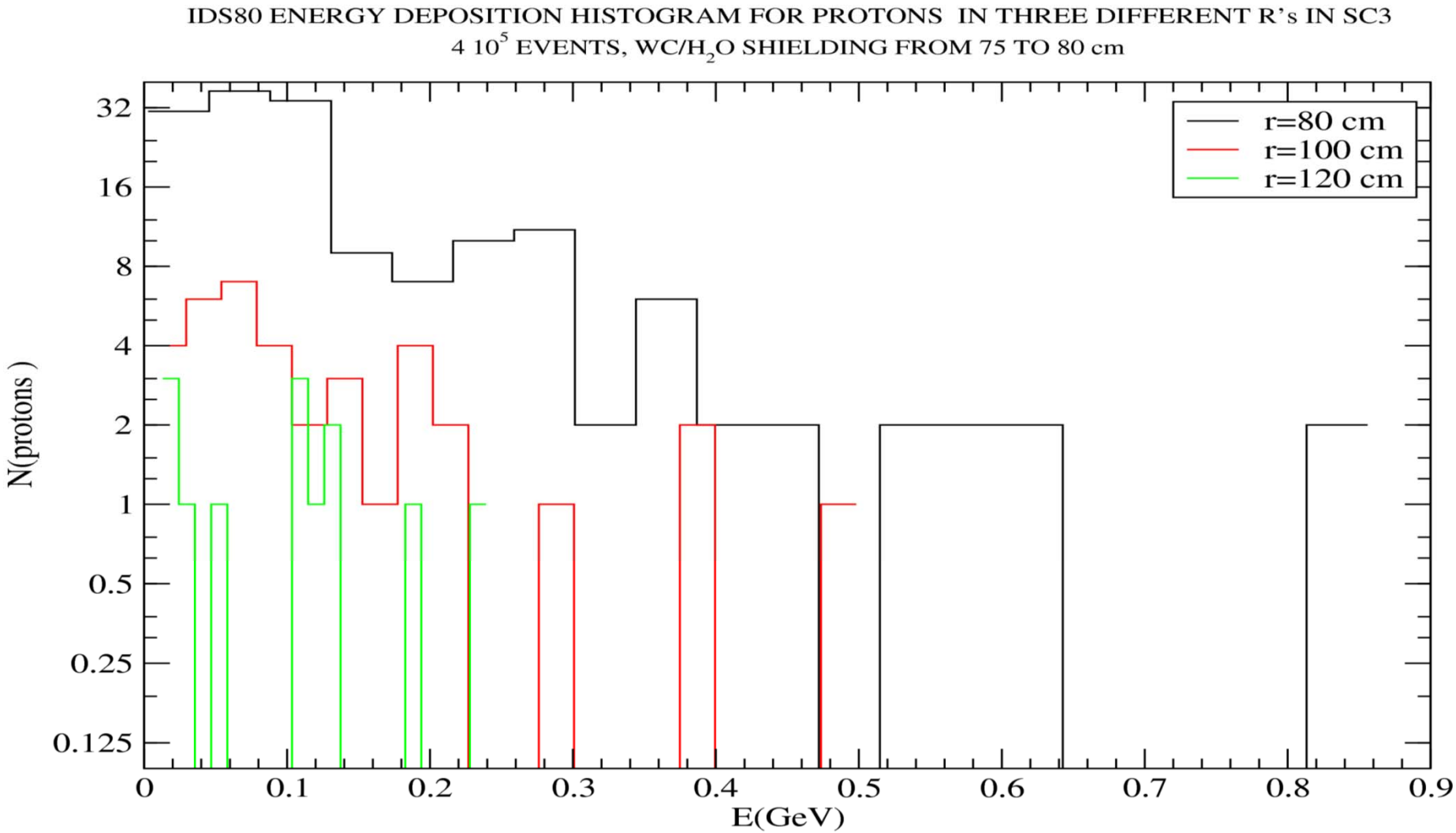
DETAILS OF PROTONS DEPOSITED ENERGY IN SC#3 (+y SLICE: -1.0<x<1.0 80<y<160and 0<z<145 cm) VACUUM FROM 75<r<80cm (10^5 p).



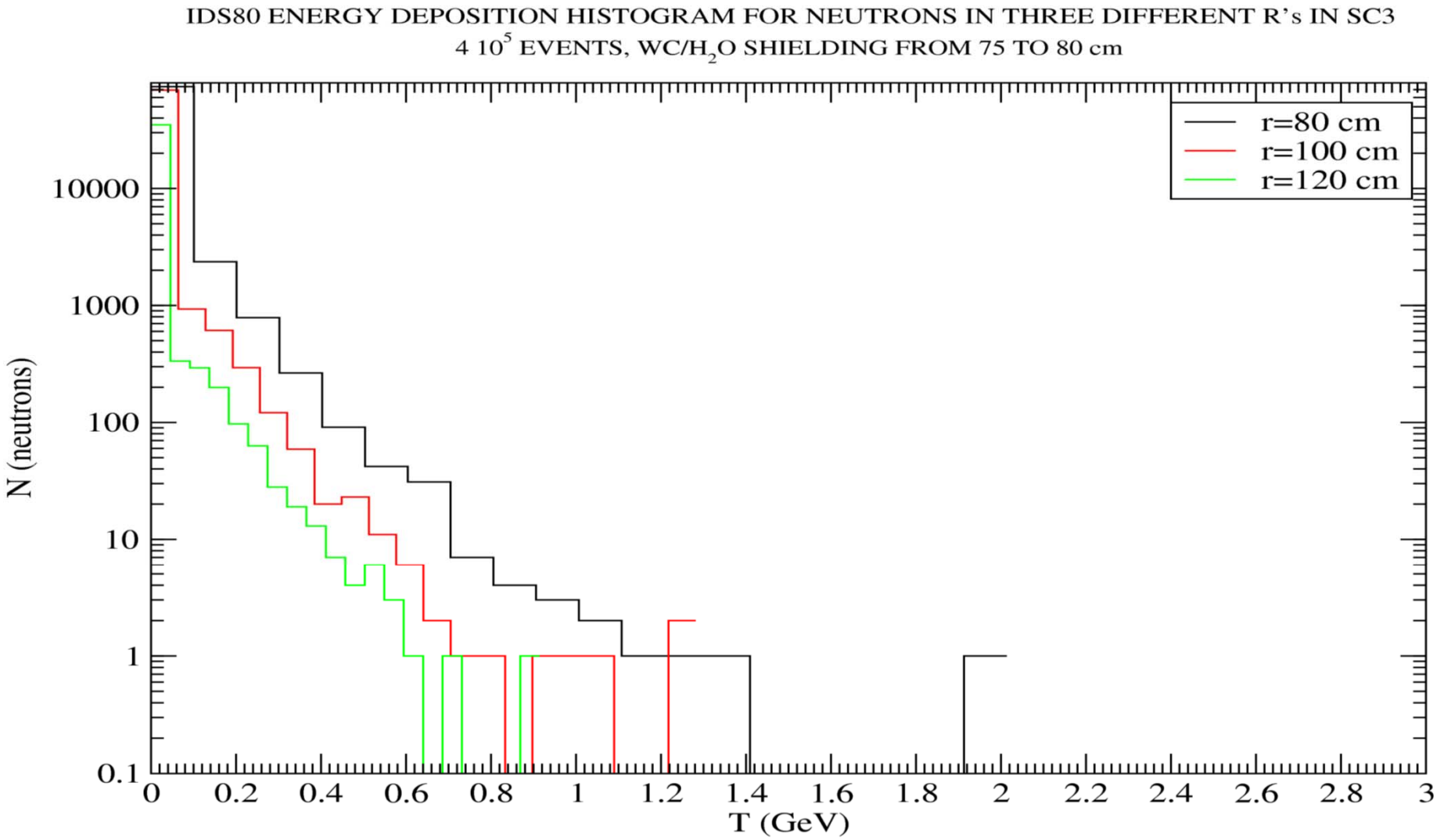
DETAILS OF TOTAL DPA IN SC#3 (+y SLICE: -1.0<x<1.0 80<y<160and 0<z<145 cm) VACUUM FROM 75<r<80cm (10^5 p).



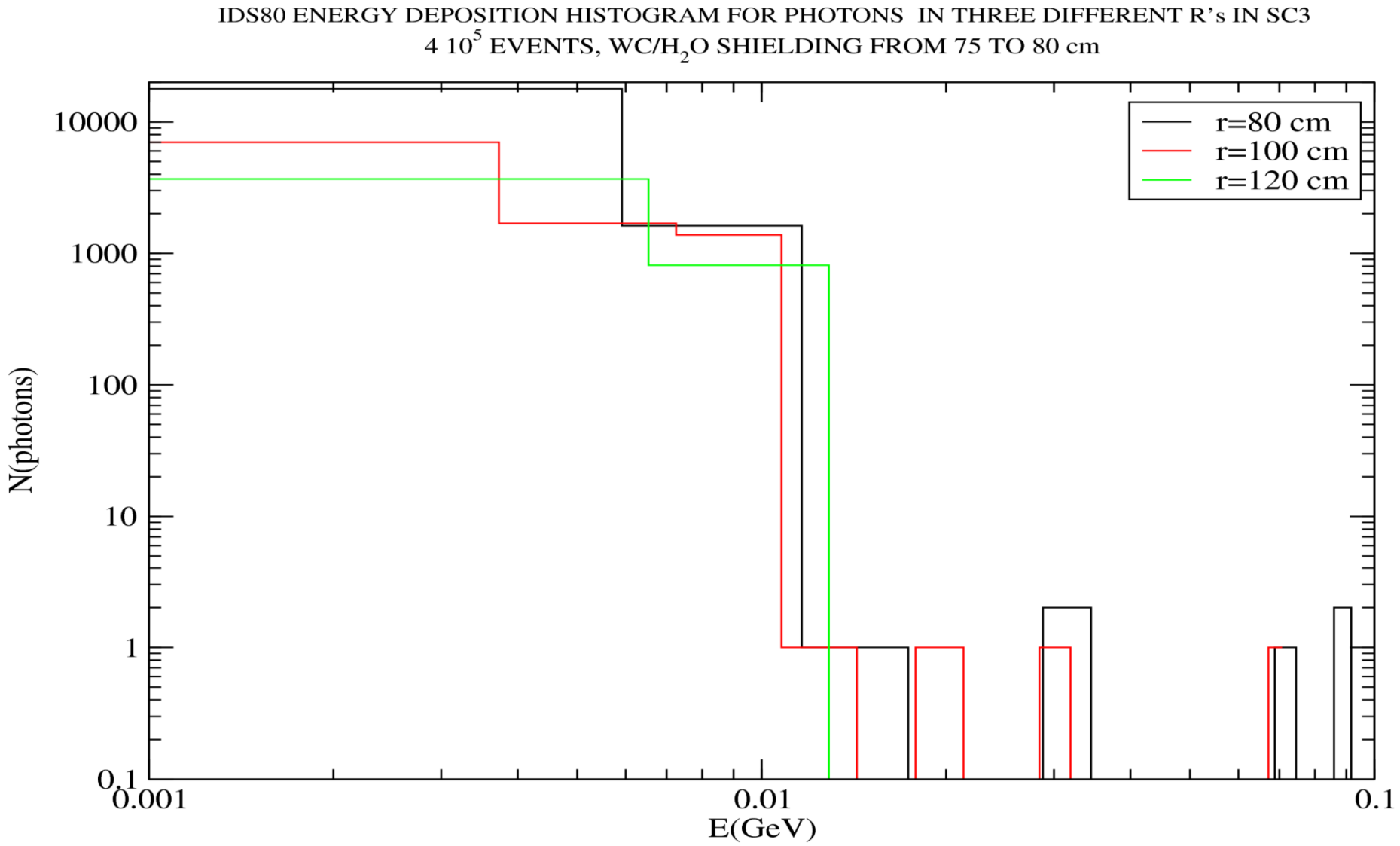
PROTONS SPECTRUM IN SC#3 (3 CYLIDRICAL SURFACES AT 80, 100 AND 120 cm) WC/H2O FROM 75<r<80cm (4. 10^5 p).



NEUTRONS SPECTRUM IN SC#3 (3 CYLIDRICAL SURFACES AT 80, 100 AND 120 cm) WC/H2O FROM 75<r<80cm (4. 10^5 p).



PHOTONS SPECTRUM IN SC#3 (3 CYLIDRICAL SURFACES AT 80, 100 AND 120 cm) WC/H2O FROM 75<r<80cm (4. 10^5 p).



PEAK VALUES OF DEPOSITED ENERGY IN SC#3, SC#11-14, FOR 10 DIFFERENT SEED VALUES, FOR IDS80 WITHOUT IRON PLUG/YOKE, IN VACUUM, (VAC IN 75<r<80 cm) 4 10^5 EVENTS.

	SEED(8 DIG.)	SC#3	SC#11-14
1	14263523	0.25	0.099
2	41124521	0.29	0.076
3	12145421	0.34	0.088
4	12215363	0.30	0.086
5	35323123	0.28	0.069
6	13221626	0.28	0.086
7	62235425	0.29	0.062
8	33435323	0.25	0.130
9	33221121	0.28	0.080
10	55265522(*)	0.28	0.082
–	MIN	0.25	0.062
–	MAX	0.34	0.130
–	AVERAGE	0.28	0.086
–	σ(Deviat.)	0.024	0.018

σ(SC#3 PEAK)~9 % AVERAGE PEAK VALUE

σ(SC#11-14 PEAK)~21 % AVERAGE PEAK VALUE